
Appendix B — Basic and Network Alternate Route Selection (BARS/NARS)

Introduction

This appendix describes the Basic Alternate Route Selection (BARS) and Network Alternate Route Selection (NARS) features for X11 software on an SL-1 system. In Canada, BARS/NARS is considered one package; BARS is not offered as a standalone package in Canada. For more information on the BARS/NARS package, contact a Northern Telecom representative.

The BARS or NARS feature enables a customer with a number of switches in different locations to "Tie together" these switches to create a private telecommunications network (see Figure 89). When implemented, the BARS or NARS feature functions to direct a call from a switch in one geographical location to a switch in any other geographical location in a cost-efficient and easy-to-use manner by:

- eliminating long, complex dialing plans and replacing them with an abbreviated Uniform dialing plan (UDP) common to all switches which are part of the network
- providing a means of controlling the number and type of trunks that are available to each network caller, and a method of controlling the time of day that access to a trunk (or group of trunks) is allowed
- selecting automatically the least-cost trunk route available to complete a call between network switches
- providing uniform network access to stations served directly at an SL-1 node (see Note) and stations served at SL-1 mains or conventional mains (see note) connected to an SL-1 node by Tie trunks

- providing the call originator with the option to either accept or refuse call completion over an expensive trunk, if less expensive trunks are not currently available
- providing optional queuing features which enable a call originator (when all trunks are busy) to either remain off-hook until a trunk becomes idle, or hang-up and receive a callback from the SL-1 when a trunk becomes idle.

Switch types

Terminology used in this publication is based on the following definition of switch types:

SL-1 ESN Node

An SL-1 equipped with the NARS or BARS feature.

SL-1 ESN Main

An SL-1 connected by Tie trunks to an SL-1 node and equipped with the Network Signaling (NSIG) feature package. (The connected SL-1 Node must also be equipped with the NSIG feature package.)

Conventional Main

An SL-1 switch connected by Tie trunks to an SL-1 node, but not equipped with the Network Signaling feature package. Conventional Main also applies to any other switch type (for example, step-by-step) connected by Tie trunks to an SL-1 node.

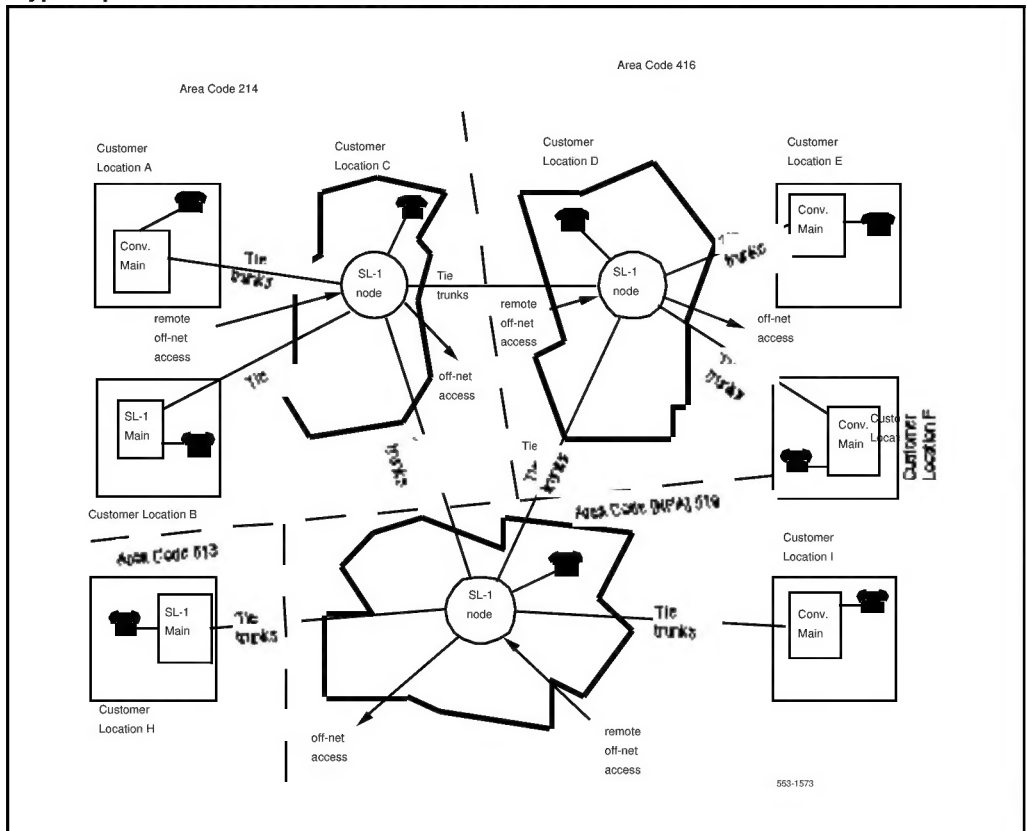
Whether the BARS or NARS feature is used depends on the number and placement of switches within the customer's private network, as well as the volume of traffic the network is to carry. NARS has the ability to translate location codes while BARS translates codes used for on-net dialing as special numbers. Refer to the section on on-net to off-net automatic overflow.

When used in large widely-dispersed applications, NARS forms an integral part of Northern Telecom's Electronic Switched Network (ESN) product. For more complete details, refer to *Electronic Switched Network description* (309-3001-100).

Other optional features that enhance the capabilities of BARS or NARS (Off-Hook Queuing, Network Authorization Codes, for example) are mentioned briefly in this publication. The following publications describe these optional features:

- *Network Queuing description* (552-2751-101)
- *Coordinated Dialing Plan description* (553-2751-102)
- *Basic and Network Authorization Code description* (553-2751-103)

Figure 89
A typical private telecommunications network



Network class of service

Network Class of Service (NCOS) is an integral part of the BARS and NARS features at an SL-1 node, and of the Network Signaling feature at an SL-1 ESN Main.

NCOS provides the means to control:

- which trunk routes are eligible to be accessed to attempt call completion
- whether or not queuing is offered to a call originator
- whether or not the call originator receives a warning tone when an expensive trunk is selected to complete a call
- whether or not the user is allowed to access the Network Speed Call feature.

Table 34 summarizes the NCOS and other parameters for SL-1 nodes and SL-1 mains.

Once each NCOS group is defined through SL-1 service change, then line, trunk, and attendant groups are assigned to the NCOS group which best serves its requirements. The NCOS group to which each line, trunk, or attendant group is assigned is independent of the assigned SL-1 class of service. Tie trunks incoming from SL-1 mains or conventional mains are also assigned to an NCOS group (at the node) which determines their level of access to the network facilities at the node.

Table 34
Summary of node and Main parameters

Parameter (Note 2)	BARS node	NARS node	ESN main
NCOS Groups (Note 3)	0 - 7 (0-99)	0 - 15 (0-99)	0 - 15 (0-99)
Facility Restriction Levels	0 - 7	0 - 7	0 - 7
Digit Manipulation Tables	1 - 255	1 - 255	—
Route Lists	0 - 127	0 - 255	—

Table 34
Summary of node and Main parameters

Parameter (Note 2)	BARS node	NARS node	ESN main
Route List Entries	0 - 7 (0-31)	0 - 7 (0-31)	
FCAS Tables (Note 1)	1 - 127	1 - 255	—
SDR Tables (Note 1)	0 - 255	0 - 511	—
SDRR ⁵⁺ Tables (Note 1)	0 - 255	0 - 511	—
TOD Schedules (Note 1)	0 - 7	0 - 7	—
Note 3: The values in parentheses () are for X11 release 13 and later.			
Note 4: FCAS = Free Calling Area Screening SDR = Supplemental Digit Restriction SDRR = Supplemental Digit Restriction/Recognition TOD = Time-Of-Day			
Note 5: If the NARS and BARS features are equipped in the same switch but for different customers, the highest parameter values apply to that switch. For example, if one customer has NARS and another customer has BARS, the NARS parameters apply to the BARS customer.			
Note 6: If the New Flexible Code Restriction (NFCR) feature is equipped in conjunction with BARS or CDP, the number of available NCOSs is 8. With X11 release 13 and later, this number is expanded to 100. NFCR is described in <i>X11 features and services (553-3001-305)</i> .			

Facility Restriction Level

Included as part of each NCOS group is a Facility Restriction Level (FRL) number which ranges from 0 (low-privilege) to 7 (high-privilege). The FRL is used by the SL-1 software to determine the alternate route selection choices available for network call attempts by users within an NCOS group.

Example

A user assigned to an NCOS group with an FRL of 3 would be allowed access only to alternate route selection choices that have an assigned FRL of 3 or less; access to route choices with an FRL greater than 3 would be denied. Thus, by assigning low-privilege users to an NCOS group with a low FRL, and high-privilege users to an NCOS group with a higher FRL, the customer can control worker/management access to all network facilities.

Expensive Route Warning Tone

In some instances, expensive trunk routes may be assigned an FRL that would enable them to be accessed by certain network users. When this occurs, the originator of the call may be sent an optional Expensive Route Warning Tone (ERWT). (ERWT eligibility is defined through the user's assigned NCOS group.) NCOS groups must have CBQ type A in order to hear ERWT.

The ERWT alerts the user that expensive facilities have been selected to complete the call. The caller may opt to either accept or reject call completion over the expensive facilities. The caller must make this choice within a customer-programmable time. Refer to SL-1 service change programs in the *X11 input/output guide* (553-3001-400), specifically LD86 the ERDT timer, for more information.

Queuing features

Eligibility for the Off-Hook Queuing (OHQ) or Call-Back Queuing (CBQ) features is defined through the user's assigned NCOS group. See *Network Queuing description* (553-2751-101).

Basic/Network Alternate Route Selection

The NARS and BARS features provide comprehensive and flexible networking packages that can be configured to satisfy the specific requirements of a customer's private network. The BARS or NARS packages provide benefits to users through simplified dialing plans and reduced communications costs. Prime elements of the BARS or NARS features are:

- Simple network access codes
- Uniform dialing plan
- Dialing transparency

- Automatic least-cost routing
- Time-of-Day (TOD) routing
- Network controls through Network Class of Service (NCOS), Traveling Class of Service (TCOS), FRL, and regular SL-1 COS
- Routing control through NCOS alterations based on a special TOD schedule
- 1-4 digit translation and 1-7 digit restriction (X11 release 4)
- 1-4 digit translation, 1-7 digit restriction, and 1-7 digit recognition (X11 release 5)
- 1-11 digit translation, restriction, recognition (X11 release 8)
- Free Calling Area Screening (FCAS)
- Expensive Route Warning Tone (ERWT)

Uniform dialing plan

The Uniform dialing plan (UDP) is not a feature of BARS or NARS, but is an operation that enables users at an SL-1 node, SL-1 main, or conventional main to dial all calls in a uniform manner regardless of the location of the calling party or the route which the call will take. (UDP now applies to BARS on X11 release 5 using off-net number recognition and calling HLOC and SPN or NXX codes.) LOCs are programmed as NXXs or SPNs.

UDP for on-net calling

An on-net call is one which terminates at a customer-owned location. To reach any on-net location, the user dials the NARS or BARS on-net access code (AC1), followed by seven digits. The dialing format for this call would be:

AC1 * LOC + XXXX (For NARS)

AC1 * SPN + XXXX (For BARS)

Legend:

AC1 = the 1-digit or 2-digit NARS on-net access code

 = NARS dial tone (optional)

LOC = a 3-digit location code assigned for the destination location

SPN = a 3-digit code assigned for the destination location

XXXX = the extension number of the party to be reached at the destination location.

Each switch which is part of the BARS or NARS network is referenced by a unique three-digit location (LOC) SPN or NXX code assigned at the SL-1 Node. There must be no conflict between the location code number assigned for a switch and Number Plan Area (NPA) codes.

A customer-owned location can be either physically connected to the network (by means of private trunk facilities) or virtually connected to the network (by means of public facilities). If a location is virtually connected to the network, the dialed LOC code is translated and converted by the SL-1 Node into the public number for the virtual location; for example, the Direct Distance Dialing (DDD) number or the Direct Inward Dialing (DID) number. Using digit manipulation for BARS, an SPN can be changed into the public network LDN.

Figure 90 illustrates a private network with a typical UDP. A user at LOC 776 (customer location I) wishing to call extension number 3283 at LOC 777 (customer location H) would first dial 8 (AC1), pause for NARS dial tone (optional), then dial 777-3283. A user at any other customer location that is part of the network would dial these same numbers to reach extension 3283.

UDP for off-net calling

An off-net call is one that does not terminate at a customer-owned location, even though some on-net facilities may be used to complete a portion of the call routing. Referring to Figure 90, a call would be termed off-net if a user at LOC 776 called a station number associated with CO 758-XXXX in the foreign area code 214.

Tables 35 and 36 list the dialing formats for the various types of NARS and BARS UDP calls respectively.

Figure 90
Example of a network with a typical NARS Uniform dialing plan

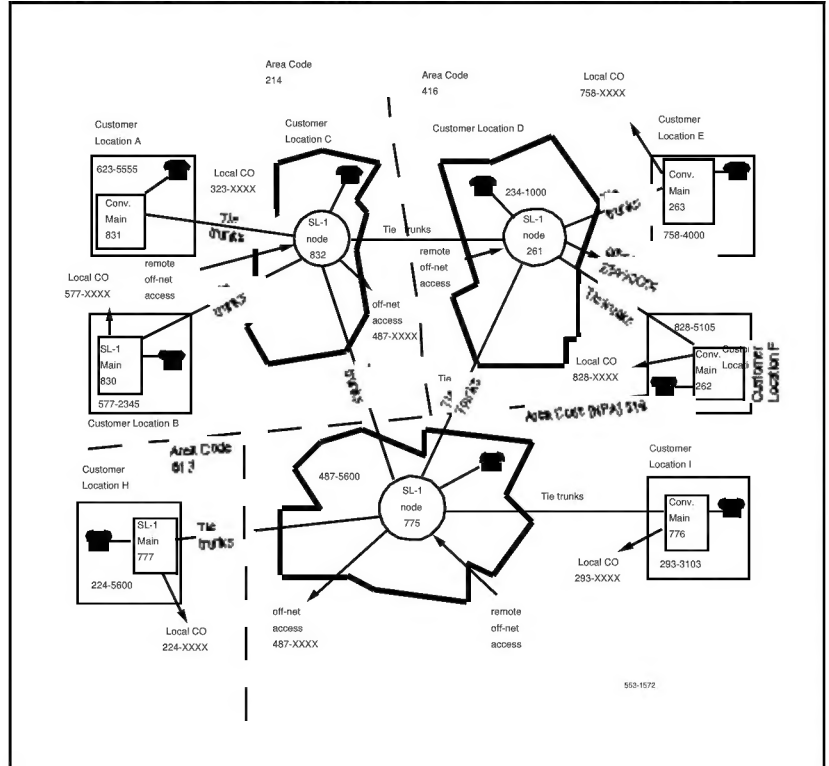


Table 35
Dialing formats for NARS UDP calls

Call type	Dialing format	Code capacity
On-Net (Notes 1, 2, and 3)	AC1 * LOC + XXXX	640
DDD FNPA (Note 1)	AC1 * 1 + NPA + NXX + XXXX	160
Network Speed Call	AC1 * LA + LN	1 - nn
Operator-assisted DDD	AC1 * 0 + NPA + NXX + XXXX	160
International DDD	AC1 * 011 + CC + NN	99
Operator-assisted International DDD	AC1 * 01 + CC + NN	99
DDD HNPA (Note 1)	AC1 or AC2 * 1 + NXX + XXXX	1
DDD Operator	AC2 * 0	1
Local Calls (Note 1)	AC2 * NXX + XXXX	640
Special Local Services	AC2 * SPN	8
Toll-free Calls	AC2 * 800 + NXX + XXXX	1
Toll-free Calls (Note 1)	AC2 * 1 + 800 + NXX + XXXX	1
Toll Special Numbers	AC2 * 900 + NXX + XXXX	1
Toll Special Numbers (Note 1)	AC2 * 1 + 900 + NXX + XXXX	1
Note 1: If 1+ Dialing is used, the On-Net and Local Calls code capacities are increased to 800 and 792 respectively.		
Note 2: If the code 1XX is reserved for future 1+ Dialing use, and not for Network Speed Call codes, then the location code capacity will be reduced to 639 if a three-digit Network Speed Call (NSC) code is used, 632 if a two-digit NSC code is used, or 560 if a one-digit NSC code is used.		
Note 3: When 1+ Dialing is used, Network Speed Call access will be in the form of 2XX-9XX as a subset of the location codes utilized in the UDP. The location code capacity will be reduced to 799 if a three-digit NSC code is used, 792 if a two-digit NSC code is used, or 720 if a one-digit NSC code is used.		
Note 4: See following page for legend of acronyms and dialing format abbreviations.		

Table 35
Dialing formats for NARS UDP calls

Call type	Dialing format	Code capacity
Legend		Legend
AC1	Access code for on-net, long distance and Network Speed Calls. Typically the digit "8" but can be either one or two digits in length.	AC1
AC2	Access code for local calls. Typically the digit "9" but can be either one or two digits in length.	AC2
*	Symbol meaning NARS dial tone (optional).	*
NPA	Numbering Plan Area (NPA) code. Any number of the form N0X or N1X.	NPA
HNPA	Home Numbering Plan Area (HNPA) code. Any number of the form N0X or N1X.	HNPA
FNPA	Foreign Numbering Plan Area (FNPA) code. Any number of the form N0X or N1X.	FNPA

Table 35
Dialing formats for NARS UDP calls

Call type	Dialing format	Code capacity
CC	Country code. Any one, two, or three digits from 2 to 9.	CC
NN	National Number. Depends on national dialing plan; maximum 12 digits including the Country Code.	NN
N	Any of the digits from 2 to 9.	N
X	Any of the digits from 0 to 9.	X
LA	List access code. Any one, two, or three digits from 0 to 9.	LA
LN	List element number. Any one, two, or three digits from 0 to 9 and up to a maximum of 1000 element numbers.	LN
LOC	Three-digit location code for each UDP network location.	LOC
NXX	Local Exchange Code.	NXX
XXXX	Four-digit directory (extension) number.	XXXX
SPN	Special numbers for example, 411, 611 or may be XXXX.	SPN

Table 36
Dialing formats for BARS calls

Call type	Dialing format
On-Net	(1) AC1 * SPN + XXXX (2) AC1 * NXX + XXXX
DDD FNPA	AC1 * 1 + NPA + NXX + XXXX
Operator-assisted DDD	AC1 * 0 + NPA + NXX + XXXX
International DDD	AC1 * 011 + CC + NN
Operator-assisted International DDD	AC1 * 01 + CC + NN
DDD HNPA (if applicable)	(1) AC1 * 1 + NXX + XXXX (2) AC1 * 1 + NPA + NXX-XXXX (see note)
DDD Operator	AC1 * 0
Local Calls	AC1 * NXX + XXXX
Special Local Services	AC1 * 411, 611 etc.
Toll-free Calls	AC1 * 1 + 800 or 1 + 900 + NXX + XXXX
Note 1: 1 + dialing is optional; you can simply enter 1 NPA.	
Legend	

Table 36
Dialing formats for BARS calls

Call type	Dialing format
AC1	Access code for on-net, long distance and Network Speed Calls. Typically the digit "9" but can be either one or two digits in length.
*	Symbol meaning wait for BARS dial tone (optional).
NPA	Numbering Plan Area (NPA) code. Any number of the form N0X or N1X.
HNPA	Home Numbering Plan Area (HNPA) code. Any number of the form N0X or N1X.
FNPA	Foreign Numbering Plan Area (FNPA) code. Any number of the form N0X or N1X.
CC	Country code. Any one, two, or three digits from 2 to 9.
SPN	Special Number. Code used to identify other office locations on the network, or a number such as 411 or 611.
NN	National Number. Depends on national dialing plan; maximum 12 digits including the Country Code.
N	Any of the digits from 2 to 9.
X	Any of the digits from 0 to 9.

BARS access code

Long distance calls and calls to distant company locations ("on-network" calls) from the SL-1 Node are made by dialing the BARS access code (AC1) followed by the desired number. The BARS access code (AC1) is typically the digit 8, but is a customer defined one or two-digit number.

There can be no conflict between the BARS access code and any other part of the dialing plan at the node. Dial tone may or may not be provided to a caller after the BARS access code is dialed at the option of the customer.

Dialing the BARS AC1 triggers the BARS software to perform the call-processing and routing required for call completion. This is accomplished by means of a network translation table associated with the BARS access code. Normal SL-1 translation is used for all other call type; local or off-network calls made by dialing the digit 9.

NARS access codes

To access NARS, the user dials either one of the two customer defined NARS access codes: AC1 or AC2. These access codes are typically 8 for on-net and long distance calls (AC1); and 9 for off-net and local calls (AC2). However, any one-digit or two-digit access codes can be used, provided that AC1 is different from AC2 and there is no conflict with any other part of the dialing plan. Dial tone may or may not be provided to a caller after either NARS access code is dialed, at the option of the customer.

Dialing either of the NARS access codes triggers the NARS software to perform the call-processing and routing required for call completion. This is accomplished by means of network translation tables. There is a network translation table associated with each NARS access code. This translation mechanism is used to implement the NARS Uniform dialing plan for private networks.

Network translation

The normal SL-1 digit translator reads the dialed network access code, determines if the call is to be processed by BARS or NARS, and selects the appropriate Network Translation (see Table 37). BARS or NARS translation determines the method to be used to process the call, refers to Supplementary Digit Restriction and Recognition tables if required, and applies digit restriction or recognition where it is specified. The result of translation is to invoke either route selection with a specified route list, standard call blocking, queuing, or internal recognition.

Any SL-1 switch running a version of X11 software prior to X11 release 8 will translate the first 3 digits after the access code—first 4 digits with 1+ dialing or 4-digit SPN codes. (SPNs can be 1, 2, 3, or 4 digits.)

Only one Route List Index is used for routing NPA/NXX/SPN/LOC codes. In a network with multiple switches sharing DID numbers within the same NXX, Coordinated Dialing Plan is needed to route the calls properly.

11-digit BARS or NARS translation

With 11-digit translation introduced in X11 release 8, the ESN BARS or NARS translation capabilities are expanded from four digits to a maximum of 11 digits for route selection. This means more digits are translated and therefore make similar codes translate differently. This increases the flexibility for network routing, including International calls. For example, NXX1363 becomes 13634, or 13635. More than one code can be handled by the same route list.

By allowing translation of more than four leading digits, unique unconflicted routing to a destination is possible. More than one Route List can exist for each specific code of a type. For example, the NXX 727 could only translate into one Route List previously. With 11-digit translation, as many Route Lists as are needed to eliminate code conflict or achieve network requirements can be defined by extending translation deeper into the dialed code. Table 37 compares the number of digits that can be translated prior to X11 release 8 with present capabilities.

Table 37
Digit translation

Type	Before X11 release 8	X11 release 8 and later
LOC	3	3 - 7
HLOC	3	3 - 7
NPA	3- 4	3 - 11
HNPA	3- 4	3 - 11
NXX	3- 4	3 - 8
SPN	1- 4	1- 11

Dialing transparency

Extending network access to an SL-1 Main or Conventional Main is accomplished by forming a single Tie trunk access group from the Main to the Node. Users at Main switches access the trunk group to the Node by dialing the BARS or NARS on-net access code (AC1). The SL-1 Node is arranged to insert the digit(s) for AC1 on each incoming call from the Main, thus enabling access to the network facilities of the Node in a transparent fashion. Local calling is arranged through conventional dial "9" CO trunks at the Main.

If an SL-1 node replaces a tandem switch in a Tandem Tie Trunk Network (TTTN), other tandem switches in the network can "tandem through" the SL-1 Node using the same access codes as before. This requires that there be no conflicts between the access codes for the TTTN trunks and the dialing plan implemented at the SL-1 Node.

Automatic least-cost routing

For each network call translated at an SL-1 node, BARS or NARS selects a route from up to eight outgoing alternate routes to complete the call. A list of alternate routes to a particular destination is called a route list and each route specified in the list is termed an entry. Any combination of trunks; for example, CO, FX, or Tie can be specified in a route list. BARS or NARS can select a route from a list of up to 32 outgoing alternate routes.

Use of the Bandwidth Controller (DCA System 9000) improves the capacity of T1 based tandem networks. Its dynamic alternate routing capability can independently choose the optimum path for a voice or data call. However, it will be necessary to coordinate the Bandwidth Controller routing lists with the ESN routing lists.

Typically, the first entries (routes) in a route list are the less expensive routes to a destination and comprise the initial set (I set) of routes in the list. The remaining routes in the list (if any) are the more expensive routes to a destination and comprise the extended set of routes in the list. An initial set marker, defined through service change, determines which routes comprise the initial route set. Refer to *Electronic Switched Network description* (309-3001-100) for more information on I set and extended set routes.

An SL-1 Node equipped with NARS can accommodate 256 (0-255) route lists; an SL-1 node equipped with BARS can accommodate 128 (0-127) route lists. Associated with each entry in a route list is information relevant to:

- the route number (0-511) (depending on the release)
- the minimum FRL required for access
- the time-of-day the route can be accessed
- whether or not queuing (OHQ or CBQ) is allowed on the route
- whether or not the route is to receive ERWT treatment
- a digit manipulation table index number
- a Free Calling Area Screening (FCAS) table index number
- activation/deactivation of conversion from an on-net number to an off-net number (NARS only)

Route eligibility

BARS or NARS translates the number dialed (1-11 digits) after an access code into a route list, and searches sequentially the routes in the list for an available route. Route eligibility for a given call is based on the caller's NCOS, the NCOS-defined FRL, the current time of day, and SL-1 COS.

Because each entry in a route list has a minimum FRL required for access and all network users are assigned an FRL through their NCOS, the network communications manager can restrict the type of calls allowed to particular users. For example, if the minimum FRL for all calls is 1, except for special local services numbers which are assigned an FRL of 0, then a user assigned to an NCOS group with an FRL of 0 would only be able to make calls to the special numbers. In addition, the communications manager can restrict the use of high-cost facilities by assigning a high FRL to the expensive routes in a route list and a lower FRL to a user's NCOS.

Digit manipulation

As mentioned previously, any trunk type can be specified in a route list. However, when certain trunk types are accessed, the digits dialed by the user must be manipulated to conform to the dialing requirements of the trunk. To do this, BARS or NARS uses digit manipulation tables to modify the dialed digits. There can be a maximum of 256 digit manipulation tables, each referenced by a digit manipulation index number, defined at each SL-1 Node. Digit manipulation can delete up to 15 leading digits, and insert up to 20 leading digits.

Example

A user at customer location I (Figure 90) dials 8-613-596-9084 to reach an off-net station in the 613 NPA associated with customer location H. At the SL-1 Node, BARS or NARS selects the appropriate route list for call completion to NPA 613 and finds that the only available route to that NPA is a local CO trunk which requires the insertion of the leading digit "1" for long distance calls. The route list entry for this route specifies a digit manipulation index number (0-255). "0" means no digit manipulation is required. BARS or NARS references the digit manipulation table indicated by the index number, deletes digits as specified in the table (none in this case), and inserts the required digits ("1" in this case), and completes the call on this route.

Time-of-Day routing

BARS or NARS provides for up to eight (0-7) Time-of-Day (TOD) schedules. Each entry (route) in a route list is assigned to the TOD schedule which specifies the hour(s) that the particular entry can be accessed. Thus, based on the current time of day, the most cost-effective route alternatives can be specified. A typical TOD schedule is shown in Table 38.

Table 38
A typical TOD schedule

TOD schedule	Time period
2	00:00 to 07:44 17:30 to 23:59
1	07:45 to 08:59 12:00 to 13:14 16:00 to 17:29
0	09:00 to 11:59 13:15 to 15:59
Note 1: A TOD schedule can be associated with any number of arbitrarily selected 15-minute periods. However, any one 15-minute period can appear only in one TOD schedule.	
Note 2: Normally, the user does not define 0, but lets the SL-1 define it by calculating times of day not mentioned in schedules 1-7.	

Based on the TOD schedule shown in Table 38, a route list entry assigned to TOD schedule 2 would be accessed only between the hours of 00:00 to 07:44 and 17:30 to 23:59. Access to the route at any other time would be denied. TOD schedules can be turned "on" or "off" through SL-1 service change, as traffic conditions warrant. A TOD schedule is turned on for an entry by turning off all other TOD. An X beside the schedule number turns that number off.

Flexible ESN “0” Routing

Flexible ESN “0” Routing (an X11 release 16 feature) allows routing of calls on different routes based on a few predefined non-leftwise unique dialing sequences. This means that each entry in the table cannot match the leftmost portion of any other entry in the table. For example, if “123” is an entry in the table, then no other entry may begin with “123.”

The ESN translation table will allow any or all of the following non-leftwise unique numbers (along with their associated route list) to be entered into the ESN translation table:

- 0
- 00
- 01
- 011

Flexible ESN “0” Routing is part of the existing BARS (57) and NARS (58) packages and has no interaction with other features besides these. Since NARS has two translation tables, two Flexible ESN “0” Routing datablocks will be included in NARS. This means that a call could be configured to route in two different ways.

This feature is applicable to all route types and network types that are supported by ESN. For information on the appropriate prompts and responses in service change (LD90), refer to Northern Telecom Publication *X11 input/output guide* (553-3001-400).

Automatic on-net to off-net overflow

If all on-net facilities to a location are busy or blocked, NARS can convert a dialed NARS UDP number to the Listed Directory Number (LDN) or DID number of the destination location, and use off-net facilities to complete the call. If the SL-1 Node is equipped with BARS, digit manipulation tables can be used to convert the dialed number to the off-net number (LDN or DID) of the destination location.

Example

A user at customer location I (see Figure 91) dials 8-777-3283 to reach a party with extension number 3283 at customer location H. At the SL-1 Node, NARS translates the dialed LOC number (777) into a route list, and searches all eligible routes in the list. Failing to find an available Tie trunk route, NARS then seizes local off-net facilities and, to complete the call, outpulses one of two possibilities:

- 224-3283, if customer location H is arranged for DID
- 224-5600, if customer location H is not arranged for DID

Requirements

Prior to X11 release 5, only one contiguous DID DN range can be defined per location. DNs which lie outside the range are converted to the LDN.

The capability of this feature has been enhanced in X11 release 5 software by "Multiple DID Office Code Screening" and in X11 release 8 by 11-digit translation.

Multiple DID Office Code Screening (X11 release 5+)

Multiple DID Office Code Screening is an enhancement to the On-Net to Off-Net Overflow capability of the NARS feature. This enhancement permits on-net calls which are routed through the public network using on-net to off-net conversion, to terminate at any DN which has been defined in the Location Code data block of memory. For each LOC defined, Multiple DID Office Code Screening will:

- allow the definition of multiple NXX codes,
- allow the definition of multiple ranges of DN within each NXX.

The following arrangements of multiple office codes (NXX) and multiple DN ranges are possible:

- single office code with a single DN range (the only alternative prior to generic X11 release 5)
- single office code with multiple DN ranges
- multiple office codes with a single DN range
- multiple office codes with multiple DN ranges

Requirements

- Prior to X11 release 5, only one NPA per LOC code is allowed.
- Prior to X11 release 5, ranges defined within a LOC code must be unique. Overlapping or duplication of ranges is not permitted.
- The number of digits in each DID range must be 4.
- A maximum of 20 DID ranges may be defined per location code regardless of the number of office codes.

Incoming trunk group exclusion (X11 release 5+)

Incoming Trunk Group Exclusion is an enhancement to the BARS or NARS feature which blocks calls from SL-1 and Conventional Main users who use the network to reach destinations in the home NPA, or other restricted NPAs, NXXs, LOCs and SPNs. When the feature is configured, users cannot use the network to circumvent the restrictions. Instead, they are forced to dial off-net from their own switch and become subject to whatever restrictions are imposed at the Main.

Standard call blocking is applied on outgoing calls to specific NPAs, NXXs, SPNs or LOCs at the SL-1 Node if the call is from a specific incoming trunk group. Two advantages result.

- Loopback routing through the caller's home switch (home NPA, NXX) is prevented. Calls which should have been made off-net from the caller's home switch are blocked outgoing at the node.
- Main users are prevented from using BARS or NARS to make calls to certain NPA, NXX, SPN or LOC that they are restricted from making at the home switch.

Sets of restricted trunk routes to specific NPAs, NXXs, SPNs or LOCs are defined in SL-1 Service Change. There is one Incoming Trunk Group Exclusion Index (maximum 255) for each defined NPA, NXX, SPN or LOC. Each index points to an Incoming Trunk Group Exclusion (ITGE) table. A maximum of 128 restricted routes can be defined in each ITGE table. Incoming Trunk Group Exclusion provides full 10-digit restriction for NPA and SPN codes, seven-digit restriction for NXX codes and three-digit restriction for LOC codes. The code itself may be restricted also.

When a call is received, BARS or NARS tests to see if the dialed code is a restricted type (Supplemental Digit Restriction). If it is, BARS or NARS checks whether or not it has an ITGE restriction and if there is an ITEI number (1-255) associated with it. If an ITEI is defined, the ITGE table corresponding to the dialed code is searched. If the incoming trunk route is a member of the ITGE, the BARS or NARS process is terminated and the call is blocked. Otherwise, call processing continues.

Off-net number recognition (X11 release 5+)

Off-Net Number Recognition eliminates the need for using two extra CO trunks, when a subscriber, using the private network, dials a DID or DDD number that terminates at a BARS or NARS location. Calls are routed directly to the dialed DN (DID calls) or to the LDN (DDD calls), rather than being switched from the terminating switch to the CO and back again.

Off-net number recognition parameters for local and remote DDD and DID locations are defined by the customer in the Network Translation tables and Supplemental Digit Recognition/Restriction blocks (SDRR). Recognition of up to 10 digits can be defined for SL-1 with X11 release 5 or 7 software as follows:

Table 39
SDRR (X11 release 5 or 7)

Call type	Network translation table (number of digits)	SDRR block (number of digits)
NPA	3	1 - 7
1NPA	4	1 - 7
NXX	3	1 - 4
1NXX	4	1 - 4
SPN	4	1 - 6
ISPN	4	1 - 7

With 11-Digit Translation, available on X11 release 8 and later, up to 11 digits can be defined in the following table.

Table 40
DRR (X11, release 8 and up)

Call type	Network translation table (number of digits)	SDRR block (number of digits)
NPA	3 - 10	1 to (10 - N)
1NPA	4 - 11	1 to (11 - N)
NXX	3 - 7	1 to (7 - N)
1NXX	4 - 8	1 to (8 - N)
SPN	1 - 11	1 to (10 - N)
ISPN	1 - 4	1 to (11 - N)
Note 1: The value N is equal to the number of digits defined in the Network Translation table.		

Up to 512 SDRR blocks can be defined for NARS (256 for BARS). Each table can contain up to 64 entries.

Off-Net numbers are recognized at the last intelligent BARS or NARS switch. Translation of the NPA, NXX or SPN identifies the method of treatment for the call. If the data type is SDRR and the index is an SDRR table index, supplemental digit recognition/restriction is applied by comparing the dialed digits with the numbers declared in the SDRR block.

- If no match is found in the SDRR, route selection is called, call processing resumes and the call is routed to the CO of the terminating off-net number.
- If a match is found and the number is in the "denied" block, standard call blocking takes place.

- If a match is found and the number is recognized as a terminating number at the local switch (for example, the last intelligent BARS or NARS switch), the call is terminated at the station DN (DID calls) or at the attendant DN (DDD calls).
- If a match is found and the dialed number is a recognized number terminating at a remote switch, route selection is called, the special digit manipulation takes place and the call is routed directly to the main. DID calls terminate at the dialed station and DDD calls terminate at the attendant DN. Remote recognition applies to Tie trunks only.

Supplemental digit restriction (release dependent)

Supplemental digit restriction blocks (see Table 41) function as follows:

- block (deny) access to certain telephone numbers
- recognize Off-Net calls dialed to On-Net locations
- prevent routing of calls to the home switch of the originating trunk group by either on-net or off-net facilities.

The customer can also specify through SL-1 service change the treatment that blocked calls receive; for example, overflow tone, intercept to attendant, or recorded announcement.

Table 41
Supplemental digit restriction blocks per NARS or BARS

Network package	X11 release 4 and earlier maximum	X11 release 5 and later maximum
NARS	256	512
BARS	32	256
Note 1: For X11 release 4 and earlier, one block can restrict up to 16 numbers. For X11 release 5 and later software, one block can recognize or restrict up to 64 numbers.		

Digit translation / restriction / recognition

BARS and NARS provide a 1-digit through 10-digit (11-digit with 1+ dialing) translation/restriction/recognition capability through the use of network translation tables and Supplemental Restriction/Recognition tables. There are two network translation tables with NARS; one associated with each of the network access codes (AC1 and AC2).

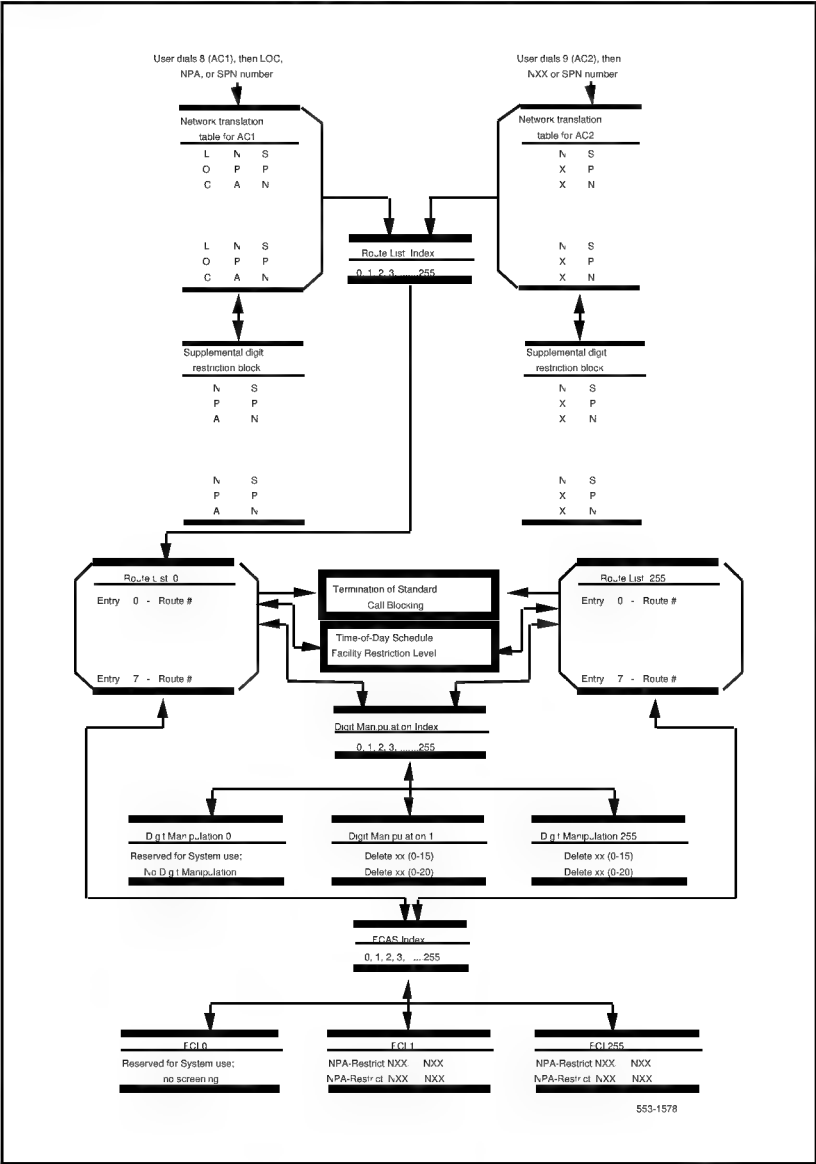
Information contained in the network translation tables is as follows:

- For each NPA entry, excluding the Home NPA (HNPA):
 - a route list index number (0-255 with NARS, 0-127 with BARS) that indicates which route list to use in processing a call to this NPA entry
 - whether or not there are telephone numbers within this NPA entry to which network calls are to be blocked; for example, “denied”
 - whether or not there are telephone numbers within this NPA entry to which network calls are to be blocked because of ITGE restrictions (X11 release 5+)
 - whether or not there are numbers under this NPA entry that are to be recognized as DID or DDD codes to an On-Net location (X11 release 5+)
 - a list (up to 64) of 1- to 7-digit numbers that follow the NPA and are to be blocked or recognized in this NPA.

- For each NXX entry:
 - a route list index number (0-255 with NARS; 0-127 with BARS) that indicates which route list to access in processing a call to this NXX entry
 - whether or not there are telephone numbers within this NXX entry to which network calls are to be blocked
 - whether or not there are telephone numbers within this NXX entry to which network calls are to be blocked because of ITGE restrictions (X11 release 5+)
 - whether or not there are numbers under this NXX entry that are to be recognized as DID or DDD codes to an On-Net location (X11 release 5+)
 - a list of up to 64, 1- to 4-digit numbers that follow the NXX and are to be blocked or recognized in this NXX
- For each LOC entry, excluding the Home LOC code (not applicable to a BARS-equipped switch):
 - a route list index number (0-255) that indicates which route list to access in processing a call to this LOC entry
 - the Listed Directory Number (LDN) to which the LOC entry is to be converted when using off-net DDD facilities
 - the range of DID numbers to which the LOC entry can be converted when using DID facilities
 - whether or not there are LOC entries to which network calls are to be blocked because of ITGE restrictions (X11 release 5+)

- For each SPN (special number) entry:
 - a route list index number (0-255 with NARS; 0-127 with BARS) that indicates which route list to access in processing a call to this SPN
 - whether or not there are digits following SPN numbers to which network calls are to be blocked
 - whether or not there are SPN numbers to which network calls are to be blocked because of ITGE restrictions (X11 release 5+)
 - whether or not there are numbers under this SPN that are to be recognized as DID or DDD codes to an On-Net location (X11 release 5+)
 - a list of up to 64, 1 to 7 numbers that are to be blocked or recognized when following the SPN

Figure 91
NARS elements accessed at an SL-1 node to process a network call



Free Calling Area Screening

Free Calling Area Screening (FCAS) is a BARS or NARS feature which provides the customer with the capability of full six-digit (NPA-NXX) screening to determine the route choice for completion of off-net calls. With FCAS, a customer can allow calls to NXX codes within the "free calling area" surrounding a particular on-net location, and restrict (deny) calls to those NXX codes that would incur long distance charges.

FCAS is implemented in a way similar to the method used for digit manipulation (for example, through FCAS tables). There can be up to 255 FCAS tables defined at an SL-1 node equipped with NARS (BARS can accommodate 127 FCAS tables). Each table can contain up to 15 NPA codes (only 7 NPA codes with BARS). Up to 800 NXX codes can be restricted or allowed within each NPA code. Each FCAS table is referenced by a Free Calling Index (FCI) number (0-255 with NARS, 0-127 with BARS); "FCI = 0" is a system default meaning no Free Calling Area Screening is required. The appropriate FCI number is then assigned to the applicable route list entries.

Whenever a route list entry is being considered for an off-net call (for example, 8-NPA-NXX-XXXX), BARS or NARS checks to see if there is an FCI number (other than "0") referred to by the entry. If an FCI number other than "0" is defined, the appropriate FCAS table for the dialed NPA is found and used for NXX screening. If the dialed NXX is denied in the table, BARS or NARS will not use the route list entry for call completion, but will continue to search for another eligible route list entry. If the dialed NXX is not denied, or specifically allowed in the table, the route list entry is eligible for the call. Calls to the LDN of a location are screened only if the NPA is included as part of the LDN. NXXs allowed in an FCI table are the only ones allowed for that route list entry.

Expensive Route Warning Tone

This feature enables the network communications manager to select certain users to receive an Expensive Route Warning Tone (ERWT). Eligibility for this tone is based on the user's NCOS. The tone (three 256-ms bursts of 440 Hz) notifies the user that BARS or NARS has selected facilities designated as expensive to complete the call. The user then has the choice of either allowing the call to complete over the expensive facilities, or going on-hook to avoid the increased expense, or queuing on the I set routes. (The user must make this choice within a programmable time of 0 to 10 seconds.) The tones must be activated for the customer group and the expensive route cannot be part of the I set in the route list.

If the call originator is located at an SL-1 node or SL-1 Main and the Ring Again feature is defined for the user and the user is CBQ(a) eligible, then Ring Again may be activated to queue the call. See *Network Queuing description* (553-2751-101).

If the SL-1 Node is equipped for Call Detail Recording (CDR), acceptance of an expensive route after ERWT is received is noted in the CDR record.

BARS or NARS bypass control

A customer can allow selected users to bypass the BARS or NARS feature for call completion between any two locations; for example, two locations which share a high community of interest. To do this, routes and trunks are set up between the two locations, and assigned an access code distinct from the AC1 and AC2 codes used to access BARS or NARS. The normal SL-1 trunk controls, like Trunk Group Access Restriction (TGAR), class of service, and code restriction, are then used to enable access only to the selected users. All other users are denied access to the trunk group, and thus, are forced to use BARS or NARS for all calls.

Network Speed Call

The Network Speed Call (NSC) feature enables a user at an SL-1 node who is normally restricted from making certain types of BARS or NARS calls to make such a call if the destination is a company-approved number defined in a System Speed Call (SSC) list. This feature requires that the System Speed Call feature (see *X11 features and services* [553-3001-305]) be equipped, in addition to Network Speed Call. NSC can also be accessed by users at an SL-1 Main or Conventional Main, provided a BARS or NARS access code is used to initiate the call.

Access to the NSC feature is allowed after a NARS or BARS access code is dialed. Upon receipt of BARS or NARS dial tone (optional), the user dials a Network Speed Call access code (one to three digits). The NSC access code must be unique from all LOC, NPA and NXX codes, and special numbers defined in the translator for the BARS or NARS access code.

The NSC access code is associated with a previously defined System Speed Call list (0-253) through service change in the network translation load. If the SCC list has its length (size) changed, the list access code and list number must be deleted and reentered into the NARS translator. Associated with the SSC list is an NCOS number. The NCOS assigned to the SSC list is applied to the call only if the FRL (0-7) is greater than that associated with the call originator's assigned NCOS.

With X11 release 13 and later, the number of SSC lists has expanded from 254 (0-253) to 4096 (0-4095), depending on available system memory and other speed call usage.

If 1+ Dialing is specified for an NPA, NXX or SPN number in a translator, the digit "1" must not be used as the leading digit for Network Speed Call list codes in that translator.

The user then dials the number of the desired entry (1-1000) in the SSC list. Upon completion of dialing, the digits defined for the list entry are passed to BARS or NARS translation for processing. Route and feature (OHQ, CBQ) eligibility for call completion are based on the NCOS associated with the SSC list, if the FRL of the user's assigned NCOS is lower than that of the list.

Network Call Transfer

This feature improves the operation of the existing Call Transfer (XFER) feature between two SL-1s when a call is transferred back to the originating switch. The regular XFER feature requires two Tie trunks to complete the call. With Network Call Transfer (NXFER), if the call is transferred back to the originating switch by means of the same Tie trunk group, the originating switch completes the transfer within itself and the Tie trunks are dropped.

Both SL-1 switches must be equipped with NSIG and NXFER software for this feature to operate.

The benefits derived from the NXFER feature include:

- minimal use of access Tie lines
- improved transmission performance since Tie lines are not used for the completed connection
- operation of NXFER is the same as for the existing XFER feature.

As shown in Figure 92, the NXFER feature allows station A at one ESN switch (I) to transfer the Tie trunk call from station B (switch II) to a third party, station C (switch II). In addition to NXFER software, NSIG software is needed at both ends of Tie trunk. If the transfer is allowed, stations B and C are connected on switch II and the Tie trunks are dropped (see Figure 94). In comparison, regular SL-1 Call Transfer (XFER) requires two Tie trunks and both switches to transfer and connect stations B and C.

Figure 92
Connection during NXFER

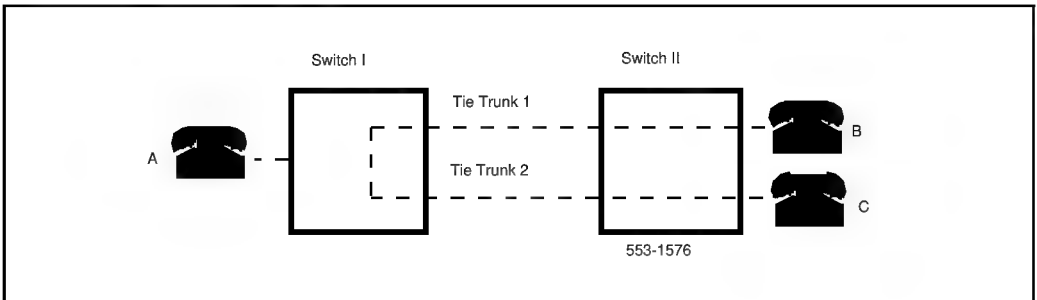


Figure 93
Connection after NXFER

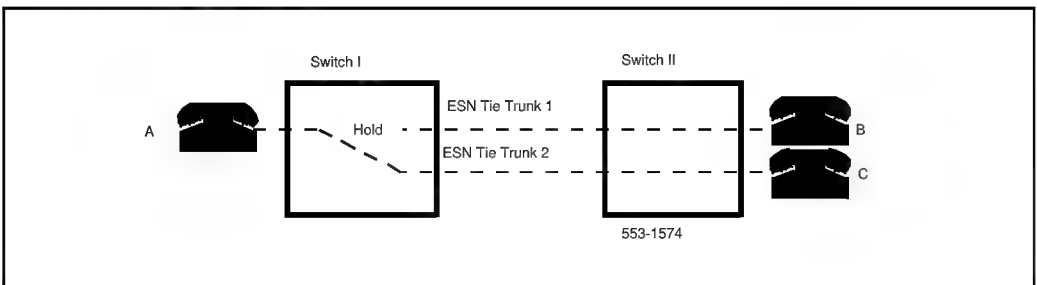
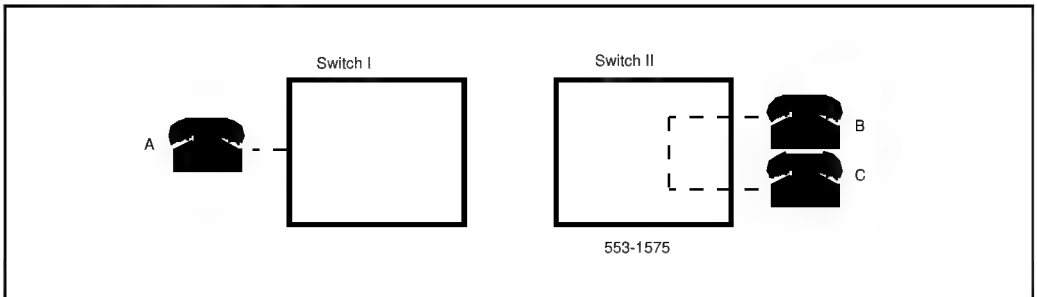


Figure 94
Connection after XFER



1 + dialing

Translation tables With 1+ dialing, the BARS or NARS translation tables are equipped for 4-digit translation (based on the first 1, 2, 3, or 4 digits), or 11-digit translation with X11 release 8 on, thus allowing BARS or NARS access code for long distance calls. NARS provides two translation tables and BARS provides one. Refer to Table 35 for dialing formats for NARS Uniform dialing plan (UDP) calls and Table 36 for BARS calls.

Code ambiguity The 1+ dialing capability also eliminates ambiguity between identical originating and terminating 3-digit NPA, NXX and LOC codes for BARS or NARS-originated calls. Thus, the BARS or NARS customer can route calls to any NPA, NXX or LOC code that conflicts with one of his 3-digit codes.

Limitation If 1+ dialing is specified for an NPA, NXX or SPN number in a translator, the digit "1" must not be used as the leading digit for Network Speed Call list codes in that translator.

Network control

Network control is an enhancement to the Network Class of Service (NCOS) feature that extends NCOS controls to users located at an SL-1 Main. Network control requires that the SL-1 Main and serving SL-1 Node be equipped with the NSIG feature. The SL-1 Main must also be equipped with the NCOS feature.

SL-1 Main NCOS

Users (lines, trunks, attendants) at an SL-1 Main are assigned an NCOS that is used to determine their level of access to network facilities at the serving SL-1 Node. When a user at an SL-1 Main initiates a call to (or through) an SL-1 node, the user's assigned NCOS or TCOS, depending on Tie trunk settings (ESN or ESN2, for example), can be transmitted.

If the user's NCOS is transmitted to the serving node and the node is equipped with BARS, only NCOS 0 through 7 can be assigned at the node. Therefore, only NCOS 0 through 7 should be assigned at the ESN Main even though an ESN Main equipped with NSIG can have an NCOS of 0 through 15. If the node is equipped with NARS, then an NCOS of 0 through 15 can be assigned both at the node and at the ESN Main.

The transmitted NCOS or TCOS overrides the NCOS or FRL assigned to the incoming Tie trunk group at the node, and is used to determine the user's eligibility for network resources/features at the SL-1 Node. Thus, a user at an SL-1 Main has the same network-access capabilities as a user at the SL-1 Node who is assigned the same NCOS.

If the user at the SL-1 Main enters a valid authorization code prior to placing a BARS or NARS call, the NCOS associated with the authorization code is transmitted to the SL-1 Node in place of the user's assigned NCOS.

Calls from a Conventional Main to the SL-1 Node are controlled by the NCOS assigned to the incoming trunk group at the SL-1 Node, since the Conventional Main has no NSIG.

SL-1 node TCOS

Network Control at an SL-1 node can provide a Traveling Class of Service (TCOS) mechanism. TCOS controls route access and Off-Hook Queuing (OHQ) eligibility for calls placed to (or through) another SL-1 node or an associated SL-1 Main. It also enables the SL-1 Node to interface with switches that are part of an Electronic Tie Network (ETN) as long as the SIGO setting on the Tie trunk route is set for ETN at both ends. Nodes can send NCOS if SIGO is set for ESN2, for example, at both ends of the Tie trunk group.

The Traveling Class of Service is, in effect, the Facility Restrictions Level (FRL) of a user's assigned NCOS. When a user at an SL-1 node initiates a call to another SL-1 Node (or an SL-1 ESN Main), the TCOS (for example, the FRL of the user's assigned NCOS) is transmitted to the other SL-1 Node. At the receiving SL-1 Node, the TCOS (0-7) replaces the FRL of the NCOS assigned to the incoming trunk group. Route access and OHQ eligibility for the call are, therefore, based on the NCOS of the incoming trunk group with the modified FRL (for example, TCOS).

The Network Control (NCTL) data block (LD87) is used to define OHQ eligibility on a per FRL (TCOS) basis (for example, if FRL 4 is defined as OHQ eligible, then all users with an NCOS with an FRL of 4 are eligible for OHQ on calls placed to another SL-1 Node or to an associated SL-1 Main).

If a user at an SL-1 Main or conventional main initiates a call that tandems through the serving SL-1 node to another SL-1 node or SL-1 Main, TCOS applies to the call as if the call originated at the serving SL-1 node.

Compatibility with ETN switches

The SL-1 TCOS is equivalent to the Traveling Class Mark (TCM) used at ETN switches. (See Technical Publication 42709, "Tie Trunk Signaling Compatibility for Connecting to a DIMENSION PBX", July 1979.)

When a seven-digit/ten-digit UDP call or a DSC (Distant Steering Code) (CDP) call is made from an SL-1 node to an ETN switch, the dialed digits together with the TCOS number (0-7) are sent to the connected ETN switch. At the ETN switch, the TCOS number received from the SL-1 Node is used as a TCM to determine route access and off-hook queuing eligibility at the ETN switch.

Similarly, when a call is made from an ETN switch to an SL-1 node, the dialed digits together with the TCM number (0-7) are sent to the connected SL-1 node. The SL-1 node interprets the received TCM number as a TCOS number. The received TCM (for example, TCOS) replaces the FRL of the NCOS assigned to the incoming trunk group from the ETN switch. This new FRL (for example, TCM) is then used to determine route access and off-hook queuing eligibility for the call. However, if a DSC (CDP) call is terminated on an SL-1 switch as a Local Steering Code (LSC) call, the TCOS value transmitted by the connected switch will not be collected and saved by this switch.

Network signaling

The Network Signaling (NSIG) feature provides the required signaling protocol to interface SL-1 nodes with SL-1 ESN Mains, SL-1 nodes with other SL-1 nodes, SL-1 nodes with conventional mains, and SL-1 nodes with Electronic Tie Network (ETN) switches.

When equipped with NSIG, an SL-1 Conventional Main is enhanced and becomes an ESN Main. When callers at an ESN Main place calls through a node or nodes with NSIG, their NCOS or TCOS travel with the call and are interpreted at other SL-1 switches that are equipped with NSIG. The Tie trunk settings determine and control the operation of this feature.

When the NSIG feature is equipped at a switch, options are available (route data block, LD16) to define the signaling arrangements between that switch and any other switch that may be connected to it by means of Tie trunks. These options define what call information is to be transmitted to a connected switch and what call information is to be received from a connected switch. The option selected depends on the type of connected switch (node, main, conventional main, ETN) and the options (for example, CCBQ, CBQCM) that are available to the connected switch.

The signaling options are: STD (standard), ESN, ESN2, ESN3, ESN5 (Electronic Switched Network), and ETN (Electronic Tie Network).

STD Arranges the Tie trunk group for transmission/reception of the called number between switches. Sends outpulsed digits.

ESN (X11 release 2 only) Arranges the Tie trunk group for transmission/reception of the call type, NCOS/TCOS, and called number between switches.

ESN2 (X11 release 3 and later) Arranges the Tie group as described for ESN in X11 release 2. Used unless switch has NXFER or Satellite Link Control (SAT).

ESN3 (X11 release 3 or 4) Arranges the Tie group as described for ESN in X11 release 2 and is required on systems equipped with the Network Call Transfer (NXFER) or Satellite Link Control features.

ESN5 (X11 release 5 and later) Arranges the Tie trunk group as described for ESN in X11 release 2; needed with DTI.

ETN Arranges the Tie trunk group for transmission/reception of the called number and TCOS/TCM between switches and is used when connected to an ETN switch. Sends outpulsed digits and TCOS.

Application

Following is a description of how these options would be applied to accommodate the different switch types that can be connected to an SL-1 Main or SL-1 Node that is equipped with the NSIG feature.

SL-1 Node An SL-1 Node can be connected by means of Tie trunks to: another SL-1 Node, an SL-1 Main, a Conventional Main, and/or an ETN Switch.

- If the SL-1 Node connects to another SL-1 Node, both ends of the connecting Tie trunk group are defined with the ETN option (called number plus TCOS/TCM), ESN2, ESN3, or ESN5.
- If the SL-1 Node connects to an SL-1 Main, both ends of the connecting Tie trunk group are defined with the ESN option (call type plus NCOS/TCOS plus called number).
- If the SL-1 Node connects to a Conventional Main, the node-end of the Tie trunk group is defined with the STD option (called number).
- If the SL-1 Node connects to an ETN switch, the node-end of the Tie trunk group is defined with the ETN option (called number plus TCOS-TCM).

SL-1 ESN Main An SL-1 Main can be connected by means of Tie trunks to an SL-1 node and satellite switches.

- For connection to an SL-1 node, both ends of the connecting Tie trunk group are defined with the ESN option (call type plus NCOS/TCOS plus called number).
- If there are satellite switches connected to the SL-1 Main, the main-end of the Tie trunk groups from the satellite switches are defined with the STD option (called number).

Requirements

The following requirements apply:

- As SL-1 Main can connect to only one SL-1 node, both switches must be equipped with the NSIG feature for NSIG-related features.
- Tie trunks between SL-1 nodes and SL-1 mains must be arranged for DTMF sending/receiving and wink-start operation.
- SL-1 Node compatibility with ETN switches is limited to seven-digit on-network, ten-digit off-network and DSC (CDP) calls.

Satellite Link Control

Tandem trunk calls, when connected through more than one communications satellite trunk, are subject to transmission distortion due to propagation to and from communications satellites. The Satellite Link Control feature ensures that the configuration of a call does not include more than one communications satellite trunk.

Requirements

This feature applies to ESN network calls (BARS or NARS/CDP) only.

- ESN Proprietary Signaling (NSIG) is required among ESN switches.
- Routes which receive digits from satellites or send digits to satellites have to be marked as SATELLITE routes for this feature to operate.

Example

When accessing an SCC, the SL-1TD is instructed to look for one of the following tones:

- Busy or overflow tone
- SCC dial tone or regular dial tone
- Ringback tone

Simultaneously a timer is started whose value is an approximation of the period in which ringback tone is normally received. When the timer expires prior to a response from the SL-1TD, a status request message is sent to the SL-1TD by software. The response from the SL-1TD indicates that a tone has been detected but is not yet identified. Based on the sequence in which tones are checked, the software assumes the tone under investigation is ringback tone and can continue the SCC call processing.

Routing control

The Routing Control feature provides a mechanism for changing a user's network-access capabilities when a special TOD schedule is in effect, or when an extended TOD is in effect, or when the user presses a Routing Control key on the console.

NCOS map

With the NARS or BARS feature, TOD schedule 7 is the special TOD schedule. Associated with the special TOD schedule is a Network Class of Service (NCOS) map. The NCOS map lists all NCOS numbers. Associated with each listed NCOS is an alternate NCOS number (greater than, equal to, or smaller than) that replaces the original NCOS number when the special TOD schedule is in effect. Table 42 illustrates a typical NCOS map.

Table 42
A typical NCOS map for special TOD schedule 7

Original NCOS	Alternate NCOS (Note)	Original NCOS	Alternate NCOS (Note)
0	0	8	2
1	0	9	3
2	0	10	3
3	1	11	4
4	1	12	4
5	2	13	5
6	2	14	5
7	2	15	5

When TOD schedule 7 is in effect, the alternate NCOS replaces the user's original NCOS.

Invoking Routing Control

The alternate NCOS numbers associated with special TOD schedule 7 are normally invoked when the time specified for TOD schedule 7 corresponds to the time in the SL-1 system clock. Additionally, the alternate NCOS numbers can be scheduled for implementation (through SL-1 service change) for the full 24-hour period of specified days of the week. This capability enables network-access capabilities to be changed automatically on weekends or company holidays.

The SL-1 attendant can also manually invoke the special TOD schedule through use of a routing control (RTC) key on the console. Pressing the RTC key lights the associated lamp, and invokes the special TOD schedule. To deactivate routing control, the RTC key is pressed again. The associated lamp goes dark and normal TOD schedules are once again in effect.

Authorization code can be used to override the restrictions imposed through routing control. If a user enters a valid Authorization code (AUTH), the NCOS number associated with the AUTH is applied for the duration of the call.

Network traffic measurements

The Network Traffic (NTRF) feature provides traffic measurement data related to network performance and network traffic at each SL-1 Node and SL-1 Main. Effective use of this data enables the network communications manager to assess the effectiveness of the network, and to identify specific areas of network operation where improvements are warranted.

Areas of network operation that are measured include NCOS, OHQ, CBQ, and routing. These measurements are provided in addition to existing non-network traffic data in *Traffic measurement formats and output* (553-2001-450).

TFN001 routing measurements

The routing measurements provide data related to route list utilization. A route list is a list of alternate trunk routes which are identified through interpretation of the dialed number. For each defined route list, these measurements show:

- how often the list was used

- which routes in the list were used
- the number of calls that were unsuccessful in completing a route list selection or connection
- queuing (OHQ and CBQ) information

These data comprise both the usage and average duration of each call against the route list. Data is output only for route lists upon which calls were attempted during the traffic study interval.

OHQ measurements

The OHQ measurements are associated with route lists, NCOS, and incoming trunk groups. OHQ enables a user to wait off-hook for a network facility to become available. The network communications manager can control the conditions for, and the duration of, the wait. The measurements present both the usage and average duration if the OHQ feature. This data comprises part of the routing measurements.

CBQ measurements

The CBQ measurements are associated with route lists, NCOS, and incoming trunk groups. If the system cannot select a route, the caller may opt to have the system establish the call at a later time when a route becomes available. The measurements indicate usage and the length of time a caller waits for an established call. The communications manager can control the conditions for CBQ and the advancement of a call within the queue. This data comprises part of the routing measurements.

TFN002 NCOS measurements

The network class of service (assigned through service change) indicates the network facilities available to the user. Traffic measurements are accumulated for each NCOS and indicate the grade of service (queuing and blocking delay, for example) provided by the system. The communications manager can change the NCOS if a grade of service is inappropriate for a user category, the definition of the NCOS is inaccurate, or the routing parameters need updating.

TFN003 incoming trunk group measurements

These measurements relate to the incremental traffic that was imposed on the incoming trunk groups by network queuing features (for example, OHQ, CBQ, CCBQ, CBQCM).

The measurements show:

- how often the incoming trunk group was offered OHQ
- the average time in the OHQ
- how often the incoming trunk group was offered CCBQ or CBQCM, and the number of acceptances
- the average time in CCBQ or CBQCM
- how often an access line was blocked when attempting a CCBQ or CBQCM callback
- how often CCBQ or CBQCM callbacks were not answered or were canceled

BARS implementation

This section provides the procedures necessary to configure Basic Alternate Route Selection (BARS). Only the service change information for BARS is shown here. For a complete discussion of prompts and responses, see the Option 11 *Software guide*. The following procedure shows the steps that must be performed to correctly implement your BARS system.

Procedure 1: Implementing BARS

- 1 Gather data for each NCOS group (LD87)
- 2 Gather data to define BARS feature parameters (LD86)
- 3 Gather data for each Digit Manipulation index (LD86)
- 4 Gather data for each Route list associated with a Digit Manipulation table (LD86)
- 5 Gather data for each Incoming Trunk Group Exclusion List (LD86)
- 6 Gather BARS translation data (LD90)
- 7 Gather data to configure a Conventional Main for Off-Net Number Recognition (LD16)
- 8 Gather data to assign a Network Class of Service group number to a list of items (LDs 10, 12, 14, 24, 88)
- 9 Enter data into the database

Configuring BARS

Step 1: Gather data for each NCOS group. Access LD87

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	NCTL	Network control
NCOS	0-7 0-99	NCOS group to be added, changed, or removed
FRL	0-7	Facility restriction level
RWTA	Yes, (No)	Expensive route warning tone

Step 2: Gather data to define BARS feature parameters. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	ESN	Electronic Switched Network data block
MXSD	0-512	Maximum number of supplemental digit restriction blocks
MXIX	0-127	Maximum number of incoming trunk group exclusion tables that can be defined
MXDM	0-256	Maximum number of digit manipulation tables
MXRL	0-128	Maximum number of route lists
AC1	xx	One- or two-digit BARS access code one
DLTN	No, (Yes)	Dial tone after dialing AC1 or AC2
ERWT	No, (Yes)	Expensive route warning tone is not (is) provided

Step 2: Gather data to define BARS feature parameters. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
ERDT	0-(6)-10	Time in seconds that a user has to accept or reject an expensive route after ERWT is given; default is 6 s; range is in 2-second intervals
TODS	x hh mm hh mm	Start and end time-of-day schedules; BARS or NARS = 0-7 x = schedule number hh = hour mm = minutes
TGAR	Yes, (No)	Check for Trunk Group Access Restrictions Yes = examine TGAR/TARG when call is placed No = ignore TGAR/TARG when call is placed

Step 3: Gather data for each Digit Manipulation index (DGT). Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	DGT	Digit manipulation index
DMI	1-255	Digit manipulation table index (see note below)
DEL	(0)-15	Number of leading digits to be deleted from the dialed number; default is 0
INST	x...x	Up to 24 leading digits to be inserted
Note 1: The maximum number of Digit manipulation tables is defined by prompt MXDM		

Step 4: Gather data for each Route List associated with A DGT . Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	RLB	Route list data block
RLI	0-127	Route list index number
ENTR	0-7 0-99	Route list entry number
RTNO	0-511	Route number associated with the index
TDET	Yes, (No)	Tone detector is (is not) used

**Step 4: Gather data for each Route List associated with A DGT .
Access LD86**

REQ	NEW, CHG, OUT	Create, change, or remove data
TYPE	TIE, (CC1), CC2	TIE = Tone detector for on-net calls (CC1) = Tone detector for Special Common Carrier, (SCC) Type 1 CC2 = Tone detector for Special Common Carrier, (SCC) Type 2
TONE	DIAL, (SCC)	Type of tone expected from SCC DIAL = normal dial tone SCC = SCC dial tone
TOD	0-7 X0-7	Time-of-Day schedule associated with the entry Turn off a time-of-day schedule
EXP	Yes, (No)	Entry is (is not) classed as expensive
FRL	(0)-7	Minimum Facility Restriction Level a user must have to access the entry
DMI	(0)-255	Index number of the digit manipulation table to be used for the entry; default is 0, no digit manipulation required
FCI	1-127	Free calling area screening table index number (FCAS) (0) = no FCAS required
OHQ	Yes, (No)	Off Hook Queuing is (is not) allowed on the entry
CBQ	Yes, (No)	Call Back Queuing is (is not) allowed on the entry
ISSET	(0)-32	Number of entries in the initial route set
MFRL	(MIN), 0-7	Minimum FRL used to determine autocode prompting

Step 5: Gather data for each Incoming Trunk Group Exclusion Index (ITGE). Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	ITGE	Incoming trunk group exclusion data block
ITEI	1-127	Incoming trunk group exclusion index number; if REQ was "OUT" all route entries defined for the entered index are removed
	<return>	Return to REQ prompt
RTNO	0-511	Route number associated with index; precede with an X to delete an existing route
	<return>	Return to REQ prompt

Step 6: Gather BARS translation data. Access LD90

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	NET	Network translation tables
TRAN	AC1, AC2, SUM	Access code 1, 2, or summary tables
TYPE	LOC HNPA NPA HLOC NXX SPN NXCL	Location code Home NPA translation code Number plan area translation code Home location code Central Office translation code Special Number translation code Speed call
	<return>	Return to REQ

Step 6: Gather BARS translation data. Access LD90

REQ	NEW, CHG, OUT	Create, change, or remove data
The following prompt occurs if TYPE is LOC:		
LOC	x...x	Location code (3 digits) or extended LOC (3 to 7)
RLI	0-255	Route list index
ITEI	(0)-255	Incoming trunk group exclusion index
LDN	xx...xx	Up to ten-digit listed directory number including NPA
DID	Yes, (No)	This location arranged for DID
MNXX	Yes, (No)	Multiple NXX codes and ranges
SAVE	1-4	Number of trailing digits to be saved in dialed extension number; must be 4 if MNXX = Yes
OFFC	xxx	NXX of the DID number; prompted if MNXX = Yes
RNGE	0-9999 0-9999	Bottom and top of range of DID numbers
The following prompt occurs if TYPE is HNPA:		
HNPA	xxx	Home NPA
The following prompts occur if TYPE is NPA:		
NPA	xxx, xxx yyy	Area code translation, extended NPA code translation
RLI	0-255	Route list index
SDRR	aaa	Type of supplemental restriction or recognition

Step 6: Gather BARS translation data. Access LD90

REQ	NEW, CHG, OUT	Create, change, or remove data
DMI	1-255	Digit manipulation table index
DENY	x...x	Number to be denied within the HNPA, NPA, NXX, SPN, or SDRR
LDID	x...x	Local DID number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
LDDD	x...x	Local DDD number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
DID	x...x	Remote DID number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
DDD	x...x	Remote DDD number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
ITED	x...x	Incoming trunk group exclusion codes for HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 7-m.
ITEI	x...x	Incoming trunk group exclusion index
Legend: m = the number of digits entered for the prompt NPA X = a command used to clear a recognized xxx code <return> = A return after each subprompt takes you back to SDRR		
The following prompts appear if TYPE is SPN:		

Step 6: Gather BARS translation data. Access LD90

REQ	NEW, CHG, OUT	Create, change, or remove data
SPN	xxxx xxxx x..	Special number translation
RLI	0-255	Route list index
SDRR	aaa	Type of supplemental restriction or recognition
DMI	1-255	Digit manipulation table index
DENY	x...x	Number to be denied within the HNPA, NPA, NXX, SPN, or SDRR
LDID	x...x	Local DID number recognized within the HNPA, NPA, NXX, or SPN
LDDD	x...x	Local DDD number recognized within the HNPA, NPA, NXX, or SPN
DID	x...x	Remote DID number recognized within the HNPA, NPA, NXX, or SPN
DDD	x...x	Remote DDD number recognized within the HNPA, NPA, NXX, or SPN
ITED	x...x	Incoming trunk group exclusion codes for HNPA, NPA, NXX, or SPN
ITEI	(0)-255	Incoming trunk group exclusion index
The following prompts appear if TYPE is NSCL:		
NSCC	xxx	One- to three-digit network speed call access code
SSCL	0-4095	System speed call list number

Step 7: Gather data to configure a Conventional Main for Off-Net Number Recognition. Access LD 16

REQ	NEW, CHG	Add or change a route
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUTE	0-511	Route number
TKTP	TIE	Tie trunk
.		
.		
.		
CNVT	Yes, (No)	Route to conventional switch (prompted if the response to TKTP is Tie)
DDMI	(0)-127	Digit manipulation index (prompted if the response to CNVT is Yes)
ATDN	xxxx	Attendant DN of conventional main (prompted if the response to CVNT is Yes)
Note 1: If the DN expansion package is equipped, the attendant DN can have up to 7 digits.; otherwise, only 4 digits can be entered.		

The following procedure involves several load programs. In all cases, the prompt is NCOS; the range is 0-99; the default is 0.

Step 8: Gather data to assign a Network Class of Service group number to a list of items

Gather data to assign a Network Class of Service group number to each of the following items:

- 500/2500 sets (LD10)
- SL-1 telephones, M1000 series telephones, M2000 series digital telephones, M3000 Touchphones (LD12)

- Attendant consoles (LD12)
- Trunks (LD14)
- Direct Inward System Access directory number See LD24)
- Authorization code (LD88)

Step 9: Enter data into the database

The final step in configuring Basic Alternate Route Selection is to enter the data gathered into the database:

- 1** Login.
- 2** Load the appropriate load program.
- 3** Enter data requested by prompts until REQ prompt returns.
- 4** More data to be added/removed?

Yes = go to Step 2

No = perform data dump

A data dump takes approximately 3 minutes to complete. If large amounts of data are being added, perform a data dump periodically. This ensures that entered data is not lost should a system reload occur.

- 5** Print data (respond with PRT to prompt REQ) and verify against data forms.
- 6** Corrections required?

Yes = go to Step 2

No = Refer to 553-2YY1-230 and perform applicable tests.

NARS implementation

This section provides the procedures necessary to configure Network Alternate Route Selection (NARS). Only the service change information for BARS is shown here. For a complete discussion of prompts and responses, refer to the Input/Output guide. The following procedure shows the steps that must be performed to correctly implement your NARS system.

Configuring NARS

Complete the following steps to configure and implement NARS.

- 1 Gather data for each NCOS group (LD87)
- 2 Gather data to define NARS feature parameters (LD86)
- 3 Gather data for each Digit Manipulation index (LD86)
- 4 Gather data for each Route list associated with a Digit Manipulation table (LD86)
- 5 Gather data for each Incoming Trunk Group Exclusion List (LD86)
- 6 Gather NARS translation data (LD90)
- 7 Gather data to configure a Conventional Main for Off-Net Number Recognition (LD16)
- 8 Gather data to assign a Network Class of Service group number to a list of items (LDs 10, 12, 14, 24, 88)
- 9 Enter data into the database

Configuring NARS

Step 1: Gather data for each NCOS group. Access LD87

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	NCTL	Network control

NCOS	0-99	NCOS group to be added, changed, or removed
FRL	(0)-7	Facility restriction level
RWTA	Yes, (No)	Expensive route warning tone

Step 2: Gather data to define NARS feature parameters. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	ESN	Electronic Switched Network data block
MXLC	0-999	Maximum number of supplemental digit restriction blocks
MXSD	0-512	Maximum number of incoming trunk group exclusion tables that can be defined
MXIX	0-256	Maximum number of incoming trunk group exclusion tables
MXDM	0-256	Maximum number of digit manipulation tables
MXRL	0-256	Maximum number of route lists
MXFC	0-256	Maximum number of free calling area screening tables
AC1	xx	One or two digit NARS/BARS access code one
AC2	xx	One or two digit NARS access code two
DLTN	No, (Yes)	NARS/BARS dial tone after dialing AC1 or AC2
ERWT	No, (Yes)	Expensive route warning tone is not (is) provided

Step 2: Gather data to define NARS feature parameters. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
ERDT	0-(6)-10	Time in seconds that a user has to accept or reject an expensive route after ERWT is given; default is 6 s; range is in 2-second intervals
TODS	x hh mm hh mm	Start and end time-of-day schedules; BARS or NARS = 0-7 x = schedule number hh = hour mm = minutes
TGAR	Yes, (No)	Check for Trunk Group Access Restrictions Yes = examine TGAR/TARG when call is placed No = ignore TGAR/TARG when call is placed

Step 3

Gather data for each Digit Manipulation index (DGT). Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	DGT	Digit manipulation index
DMI	1-255	Digit manipulation table index (see note below)
DEL	(0)-15	Number of leading digits to be deleted from the dialed number; default is 0
INST	x...x	Up to 24 leading digits to be inserted
Note 1: The maximum number of Digit manipulation tables is defined by prompt MXDM		

Step 4: Gather data for each Route List associated with A DGT. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	RLB	Route list data block
RLI	0-255	Route list index number
ENTR	0-63	Route list entry number (release 15 +)
RTNO	0-511	Route number associated with the index
TDET	Yes, (No)	Tone detector is (is not) used
TYPE	TIE, (CC1), CC2	TIE = Tone detector for on-net calls (CC1) = Tone detector for Special Common Carrier, (SCC) Type 1 CC2 = Tone detector for Special Common Carrier, (SCC) Type 2
TONE	DIAL, (SCC)	Type of tone expected from SCC DIAL = normal dial tone SCC = SCC dial tone
TOD	0-7 X0-7	Time-of-Day schedule associated with the entry Turn off a time-of-day schedule
EXP	Yes, (No)	Entry is (is not) classed as expensive
FRL	(0)-7	Minimum Facility Restriction Level a user must have to access the entry
DMI	(0)-255	Index number of the digit manipulation table to be used for the entry; default is 0, no digit manipulation required
FCI	(0)-255	Free calling area screening table index number (FCAS) (0) = no FCAS required

Step 4: Gather data for each Route List associated with A DGT. Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
OHQ	Yes, (No)	Off Hook Queuing is (is not) allowed on the entry
CBQ	Yes, (No)	Call Back Queuing is (is not) allowed on the entry
ISSET	(0)-32	Number of entries in the initial route set
MFRL	(MIN), 0-7	Minimum FRL used to determine autocode prompting

Step 5: Gather data for each Incoming Trunk Group Exclusion Index (ITGE). Access LD86

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	ITGE	Incoming trunk group exclusion data block
ITEI	1-127	Incoming trunk group exclusion index number; if REQ was "OUT" all route entries defined for the entered index are removed
RTNO	0-511	Route number associated with index; precede with an X to delete an existing route

Step 6: Enter data into the database

REQ	NEW, CHG, OUT	Create, change, or remove data
CUST	0-99	Customer number
FEAT	NET	Network translation tables
TRAN	AC1, AC2, SUM	Access code 1, 2, or summary tables
TYPE	LOC HNPA NPA HLOC NXX SPN NXCL	Location code Home NPA translation code Number plan area translation code Home location code Central Office translation code Special Number translation code Speed call
	<return>	Return to REQ
The following prompt occurs if TYPE is LOC:		
LOC	x...x	Location code (3 digits) or extended LOC (3 to 7)
RLI	0-255	Route list index
ITEI	(0)-255	Incoming trunk group exclusion index
LDN	xx...xx	Up to ten-digit listed directory number including NPA
DID	Yes, (No)	This location arranged for DID
MNXX	Yes, (No)	Multiple NXX codes and ranges
SAVE	1-4	Number of trailing digits to be saved in dialed extension number; must be 4 if MNXX = Yes
OFFC	xxx	NXX of the DID number; prompted if MNXX = Yes

Step 6: Enter data into the database

REQ	NEW, CHG, OUT	Create, change, or remove data
RNGE	0-9999 0-9999	Bottom and top of range of DID numbers
The following prompt occurs if TYPE is HNPA:		
HNPA	xxx	Home NPA
The following prompts occur if TYPE is NPA:		
NPA	xxx, xxx yyy	Area code translation, extended NPA code translation
RLI	0-255	Route list index
SDRR	aaa	Type of supplemental restriction or recognition
DMI	1-255	Digit manipulation table index
DENY	x...x	Number to be denied within the HNPA, NPA, NXX, SPN, or SDRR
LDID	x...x	Local DID number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
LDDD	x...x	Local DDD number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
DID	x...x	Remote DID number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).

Step 6: Enter data into the database

REQ	NEW, CHG, OUT	Create, change, or remove data
DDD	x...x	Remote DDD number recognized within the HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 10-m (11-m for 1 + dialing).
ITED	x...x	Incoming trunk group exclusion codes for HNPA, NPA, NXX, or SPN. The maximum number of digits allowed is 7-m.
ITEI	(0)-255	Incoming trunk group exclusion index
Legend: m = the number of digits entered for the prompt NPA X = a command used to clear a recognized xxx code <return> = A return after each subprompt takes you back to SDRR		
The following prompts appear if TYPE is NXX		
NXX	xxx, xxx yyy	Office code translation, extended NXX codes translation
RLI	0-255	Route list index
SDRR	aaa	Type of supplemental restriction or recognition
DMI	1-255	Digit manipulation table index
DENY	x...x	Number to be denied within the HNPA, NPA, NXX, SPN, or SDRR. The maximum number of digits allowed is 7-m.
LDID	x...x	Local DID number recognized within the HNPA, NPA, NXX, or SPN
LDDD	x...x	Local DDD number recognized within the HNPA, NPA, NXX, or SPN

Step 6: Enter data into the database

REQ	NEW, CHG, OUT	Create, change, or remove data
DID	x...x	Remote DID number recognized within the HNPA, NPA, NXX, or SPN
DDD	x...x	Remote DDD number recognized within the HNPA, NPA, NXX, or SPN
ITED	x...x	Incoming trunk group exclusion codes for HNPA, NPA, NXX, or SPN
ITEI	(0)-255	Incoming trunk group exclusion index
The following prompts appear if TYPE is SPN:		
SPN	xxxx xxxx x..	Special number translation
RLI	0-255	Route list index
SDRR	aaa	Type of supplemental restriction or recognition
DMI	1-255	Digit manipulation table index
DENY	x...x	Number to be denied within the HNPA, NPA, NXX, SPN, or SDRR
LDID	x...x	Local DID number recognized within the HNPA, NPA, NXX, or SPN
LDDD	x...x	Local DDD number recognized within the HNPA, NPA, NXX, or SPN
DID	x...x	Remote DID number recognized within the HNPA, NPA, NXX, or SPN
DDD	x...x	Remote DDD number recognized within the HNPA, NPA, NXX, or SPN
ITED	x...x	Incoming trunk group exclusion codes for HNPA, NPA, NXX, or SPN
ITEI	(0)-255	Incoming trunk group exclusion index

Step 6: Enter data into the database

REQ	NEW, CHG, OUT	Create, change, or remove data
The following prompts appear if TYPE is NSCL:		
NSCC	xxx	One- to three-digit network speed call access code
SSCL	0-4095	System speed call list number

Step 7: Gather data to configure a Conventional Main for Off-Net Number Recognition. Access LD16

REQ	NEW, CHG	Add or change a route
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUTE	0-511	Route number
TKTP	TIE	Tie trunk
.		
.		
.		
CNVT	Yes, (No)	Route to conventional switch (prompted if the response to TKTP is Tie)

Step 7: Gather data to configure a Conventional Main for Off-Net Number Recognition. Access LD16

REQ	NEW, CHG	Add or change a route
DDMI	(0)-255	Digit manipulation index (prompted if the response to CNVT is Yes)
ATDN	xxxx	Attendant DN of conventional main (prompted if the response to CVNT is Yes)
Note 1: If the DN expansion package is equipped, the attendant DN can have up to 7 digits.; otherwise, only 4 digits can be entered.		

The following procedure involves several load programs. In all cases, the prompt is NCOS; the range is 0-99; the default is 0.

Step 8: Gather data to assign a Network Class of Service group number to a list of items

- 500/2500 sets (LD10)
- SL-1 telephones, M1000 series telephones, M2000 series digital telephones, M3000 Touchphones (LD12)
- Attendant consoles (LD12)
- Trunks (LD14)
- Direct Inward System Access directory number See LD24)
- Authorization code (LD88)

Step 9: Enter data into the database

Enter the data gathered into the data base:

- 1** Login.
- 2** Load the appropriate load program.
- 3** Enter data requested by prompts until REQ prompt returns.

4 More data to be added/removed?

Yes = go to Step 2

No = perform data dump

A data dump takes approximately 3 minutes to complete. If large amounts of data are being added, perform a data dump periodically. This ensures that entered data is not lost should a system reload occur.

5 Print data (respond with PRT to prompt REQ) and verify against data forms.

6 Corrections required?

Yes = go to Step 2

No = Refer to 553-2YY1-230 and perform applicable tests.